

REMARKS

Favorable reconsideration of this application, in light of the preceding amendments and following remarks, is respectfully requested.

Claims 1-16 are pending in this application. Claims 1-5 and 8 are amended and no claims have been cancelled. Claims 9-16 have been newly added. Claims 1, 7, 9 and 15 are the independent claims.

Applicants note with appreciation the Examiner's acknowledgement that certified copies of all priority documents have been received by the U.S.P.T.O. Action, summary at 12.

Applicants also respectfully note the present action indicates that the drawings have been accepted by the Examiner. Action, summary at 10.

New Claims

By the present Amendment, Applicants submit that claims 9-16 have been added. Support for new claims 9-16 can be found in at least in the Specification as originally filed. As such, Applicants submit that no new matter has been added.

Specification

The abstract of the disclosure has been objected to because the abstract may not exceed 150 words. The required correction has been made. Applicants respectfully request that the objection to the specification be withdrawn.

Claim Objections

Claims 1-6 and 8 have been objected to due to informalities and minor draft errors. The minor typographical corrections requested by the Examiner have been made. Withdrawal of the objection is respectfully requested.

Example Embodiments of the Present Application

Independent claims 1, 7, 9 and 15 recite pore or particle-size distribution measurement apparatuses and methods for measuring size distribution of pores or particles existing within a porous insulator film formed on a surface of a substrate. The apparatus and method of claims 1 and 9 include irradiating the insulator film with X-rays from the insulator film's surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate. Additionally, the apparatus and method of claims 1 and 9 include detecting among reflection components reflected on the surface of the substrate of the X-rays which have been emitted from the X-ray generating means and entered the insulator film, reflection components exiting from the insulator film after entering the pore or particle and scattering, having an exit angle larger than that of reflection components which exit from the insulator film without entering the pore or particle. The apparatus and method of claims 7 and 15 include irradiating X-rays from the insulator film's surface side at an incident angle set to be larger than a total-reflection critical angle of an uppermost surface layer, and a two-dimensional position-sensitive detector for detecting scattered X-rays.

In a region where the incident angle θ_i is smaller than a critical angle θ_{c-f} of the insulator film, the X-rays undergo total reflection on the surface of the insulator film. As a result, no X-

rays are able to enter the insulator film, making it difficult or impossible to achieve measurement. Moreover, in a case where the incident angle θ_i is larger than the critical angle θ_{c-f} but smaller than a total-reflection critical angle θ_{c-s} of the substrate, the X-rays undergo total reflection once on the substrate. As a result, after the reflection, the components scattered by a pore Y are superimposed intensely, making it difficult to achieve measurement. If measurement cannot be achieved easily in a region where the scattering angle is small, determining distribution in a region where the pore size is larger may be difficult.

Rejections under 35 U.S.C. § 102

Houtman

Claims 1, 2 and 4 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Houtman (U.S. Patent No. 5,446,777). Applicants respectfully traverse this rejection for the reasons detailed below.

The Examiner states on pages 3 and 4 of the Office Action that Houtman discloses an apparatus comprising X-ray generating means for irradiating with X-rays from a surface side necessarily at an incident angle, and X-ray detecting means for detecting among reflection components reflected on the surface which have been emitted from the X-ray generating means. The Examiner cites MPEP § 2115 stating that the insulator film formed on a surface of a substrate is a material worked upon by a structure being claimed, and therefore, does not impart patentability to the claims. The Examiner also cites MPEP § 2114 which states “while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function”, in alleging that the feature “at an incident angle which is set to be larger than a total-reflection critical angle

of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” of claim 1 has not been given patentable weight.

However, Applicants respectfully submit that the feature “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” of claim 1 is a structural limitation. As such, the Examiner has not shown where Houlihan teaches or suggests “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” as recited in claim 1, and Houlihan cannot anticipate claim 1 without the above feature.

The Applicants, therefore, respectfully request that the rejection to Claim 1 under 35 U.S.C. § 102(b) be withdrawn.

Claims 2 and 4, dependent on independent claim 1, are patentable for the reasons stated above with respect to claim 1 as well as for their own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claim 1 and all claims dependent thereon.

Furthermore, newly-added claims 9-16 are also allowable over Houtman, at least for the reasons discussed above.

Mazor et al.

Claims 1, 3 and 8 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Mazor et al. (U.S. Patent No. 6,556,652). Applicants respectfully traverse this rejection for the reasons detailed below.

On pages 5 and 6 of the Office Action, the Examiner states that Mazor et al. discloses an apparatus comprising X-ray generating means for irradiating with X-rays from a surface side necessarily at an incident angle and X-ray detecting means for detecting among reflection components reflected on the surface which have been emitted from the X-ray generating means. The Examiner also cites MPEP § 2114 which states “while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function”, in alleging that the feature “at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” of claim 1 has not been given patentable weight.

However, Applicants respectfully submit that the feature “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” of claim 1 is a structural limitation. As such, the Examiner has not shown where Mazor teaches or suggests “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” as recited in claim 1, and Mazor cannot anticipate claim 1 without the above feature.

The Applicants, therefore, respectfully request that the rejection to Claim 1 under 35 U.S.C. § 102(e) be withdrawn.

Claims 3 and 8, dependent on independent claim 1, are patentable for the reasons stated above with respect to claim 1 as well as for their own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claim 1 and all claims dependent thereon.

Furthermore, newly-added claims 9-16 are also allowable over Houtman, at least for the reasons discussed above.

Koppel

Claims 1, 5 and 7 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Koppel (U.S. Patent No. 5,619,548). Applicants respectfully traverse this rejection for the reasons detailed below.

With regards to claim 1, on pages 7 and 8 of the Office Action, the Examiner states that Koppel discloses an apparatus comprising X-ray generating means for irradiating with X-rays from a surface side necessarily at an incident angle and X-ray detecting means for detecting among reflection components reflected on the surface which have been emitted from the X-ray generating means. The Examiner cites MPEP § 2115 stating that the insulator film formed on a surface of a substrate is a material worked upon by a structure being claimed, and therefore, does not impart patentability to the claims. The Examiner also cites MPEP § 2114 which states “while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function”, in alleging that the feature “at an incident angle which is set to be larger than a total-

reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” of claim 1 has not been given patentable weight.

However, Applicants respectfully submit that the feature “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” of claim 1 is a structural limitation. As such, the Examiner has not shown where Koppel teaches or suggests “irradiating the insulator film with X-rays from the insulator film’s surface side at an incident angle which is set to be larger than a total-reflection critical angle of the insulator film but less than 1.3 times a total-reflection critical angle of the substrate” as recited in claim 1, and Koppel cannot anticipate claim 1 without the above feature.

The Applicants, therefore, respectfully request that the rejection to Claim 1 under 35 U.S.C. § 102(b) be withdrawn.

With regards to claim 7, the Examiner states that Koppel discloses an apparatus comprising a point focus X-ray source for irradiating X-rays from a surface side necessarily at an incident angle and a two-dimensional position-sensitive detector for detecting scattered X-rays. The Examiner cites MPEP § 2115 stating that the insulator film formed on a surface of a substrate is a material worked upon by a structure being claimed, and therefore, does not impart patentability to the claims. The Examiner also cites MPEP § 2114 which states “while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function”, in alleging that the feature “at an incident angle set to be larger than a total-reflection critical angle of an uppermost surface layer” of claim 7 has not been given patentable weight.

However, Applicants respectfully submit that the feature “at an incident angle set to be larger than a total-reflection critical angle of an uppermost surface layer” of claim 7 is a structural limitation. As such, the Examiner has not shown where Koppel teaches or suggests “at an incident angle set to be larger than a total-reflection critical angle of an uppermost surface layer” as recited in claim 7, and Koppel cannot anticipate claim 7 without the above feature.

The Applicants, therefore, respectfully request that the rejection to Claim 7 under 35 U.S.C. § 102(b) be withdrawn.

Claim 5, dependent on independent claim 1, is patentable for the reasons stated above with respect to claim 1 as well as for its own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claims 1 and 7 and all claims dependent thereon.

Furthermore, newly-added claims 9-16 are also allowable over Houtman, at least for the reasons discussed above.

Rejections under 35 U.S.C. § 103

Koppel in view of Yokhim

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Koppel in view of Yokhin (U.S. Publication No. 2002/0150209). Applicants respectfully traverse this rejection for the reasons detailed below.

With respect to claim 6, Applicants incorporate the discussion presented above with respect to the deficiencies of Koppel to teach or suggest the pore or particle-size distribution measurement apparatus as recited in claim 1. As claim 6 depends from claim 1, Applicants submit that claim 6 is equally allowable over the applied references.

The Applicants, therefore, respectfully request that the rejection to Claim 6 under 35 U.S.C. § 103(a) be withdrawn.

CONCLUSION

In view of the above remarks and amendments, the Applicants respectfully submit that each of the pending objections and rejections has been addressed and overcome, placing the present application in condition for allowance. A notice to that effect is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

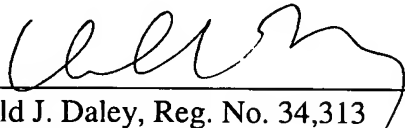
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Donald J. Daley, Reg. No. 34,313, at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By



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